CLAIMS

1. A method for producing an active matrix organic EL display element by an inkjet method to eject droplets of a liquid via an ejection hole of a nozzle so as to form an organic EL layer, the liquid comprising an organic EL layer material, wherein:

an electrostatic attraction type inkjet apparatus is used whose ejection hole has a diameter smaller than a diameter of the droplets; and

the droplets are ejected from the nozzle of the electrostatic attraction type inkjet apparatus in such a manner that each of the droplets is 1pl or less in amount.

2. A method as set forth in Claim 1, wherein:

the liquid has a volumetric concentration calculated from how many number of layers is to be formed with the droplets repeatedly ejected onto a same organic EL layer formation region.

3. A method as set forth in Claim 1, wherein:

the liquid has a viscosity of 20cP or more.

4. A method as set forth in Claim 1, wherein:

the organic EL layer has an organic light emitting layer.

5. A method as set forth in Claim 1, wherein:

the organic EL layer has a charge transport layer.

6. A method for producing an active matrix organic EL display element by an inkjet method to eject droplets of a liquid via an ejection hole of a nozzle so as to form an organic EL layer, the liquid comprising an organic EL layer material, wherein:

an electrostatic attraction type inkjet apparatus is used, the electrostatic attraction type inkjet apparatus being for ejecting droplets via its nozzle in such a manner that, each of the droplets is 1pl or less in amount; and

the liquid has a volumetric concentration η (%) that is substantially $\beta \times t/(\alpha \times D)$, where α is a number of layers to be formed with the droplets repeatedly ejected on a same organic EL layer formation region, β is a value obtained from a ratio between the diameter of the droplets and a diameter of landed droplets in the organic EL layer formation region, D is the diameter of the droplets, and t is a thickness of the organic EL layer to be formed.

7. A method as set forth in Claim 6, wherein:

the ejection hole of the electrostatic attraction type inkjet apparatus is smaller than the droplet in diameter.

8. A method as set forth in Claim 6, wherein:

the liquid has a viscosity of 20cP or more.

9. A method as set forth in Claim 6, wherein:

the organic EL layer has an organic light emitting layer.

10. A method as set forth in Claim 1 or 3, wherein:

the organic EL layer has a charge transport layer.

11. An active matrix organic EL display element, produced by using the method as set forth in any one of Claims 1 to 10.

12. An apparatus for producing an active matrix organic EL display element, the apparatus adopting an inkjet method to eject droplets of a liquid via an ejection hole of a nozzle so as to form an organic EL layer, and the liquid comprising an organic EL layer material, wherein:

the ejection hole of the nozzle has a diameter smaller than a diameter of the droplets, the inkjet method is of electrostatic attraction type, and each of the droplets ejected via the nozzle is 1pl or less in amount.

13. An apparatus for producing an active matrix organic EL display element, the apparatus adopting an inkjet method to eject droplets of a liquid via an ejection

hole of a nozzle so as to form an organic EL layer, and the liquid comprising an organic EL layer material, wherein:

the inkjet method is of an electrostatic attraction type and each of the droplets ejected is 1pl or less in amount; and

the liquid has a volumetric concentration η (%) that is substantially $\beta \times t/(\alpha \times D)$, where α is a number of layers to be formed with the droplets repeatedly ejected on a same organic EL layer formation region, β is a value obtained from a ratio between the diameter of the droplets and a diameter of landed droplets in the organic EL layer formation region, D is the diameter of the droplets, and t is a thickness of the organic EL layer to be formed.

14. A method for producing a liquid crystal array having a pair of substrates facing each other and having a gap in which a liquid crystal is filled, the gap formed by a spacer provided between the substrates, at least one of the substrates having an aperture section, and the method comprising the steps of (i) ejecting droplets of a spacer material via an ejection hole of the nozzle by an inkjet method, and (ii) curing the spacer material so as to form the spacer, wherein:

the ejection hole of the nozzle has a diameter smaller than a diameter of the droplets, the inkjet method is of electrostatic attraction type, and each of the droplets

ejected via the nozzle is 1pl or less in amount.

15. A liquid crystal array as set forth in Claim 14, wherein:

a material ejected from the nozzle has a viscosity of 30cP or more.

16. A method as set forth in Claim 14, wherein:

that substrate on which the spacer is to be formed is configured such that a color filter is formed on a transparent substrate, the color filter colored with at least three colors or more.

17. A method as set forth in Claim 14, wherein:

that substrate on which the spacer is to be formed is an active matrix substrate in which an active element is provided per pixel.

18. A method for producing a liquid crystal array having a pair of substrates facing each other and having a gap in which a liquid crystal is filled, the gap formed by a spacer provided between the substrates, at least one of the substrates having an aperture section, the method comprising the steps of (i) ejecting droplets of a spacer material via an ejection hole of the nozzle by an inkjet method, and (ii) curing the spacer material so as to form

the spacer, the method comprising:

causing a tip portion of the nozzle to be in contact with a spacer formation surface of a substrate;

applying a voltage to an electrode of the nozzle being in contact with the spacer formation surface, so as to shrink the spacer material; and

releasing the spacer material continuously, via the nozzle under the voltage application as the nozzle is moved away from the substrate, so as to form, on the substrate, the spacer having a column-like shape.

19. A method as set forth in Claim 18, wherein:

the ejection hole of the nozzle has a diameter of 8μm or less.

20. The method as set forth in Claim 18, wherein:

a material ejected from the nozzle has a viscosity of 30cP or more.

21. A method as set forth in Claim 18, wherein:

that substrate on which the spacer is to be formed is configured such that a color filter is formed on a transparent substrate, the color filter colored with at least three colors or more.

22. A method as set forth in Claim 18, wherein:

that substrate on which the spacer is to be formed is an active matrix substrate in which an active element is provided per pixel.

23. A method for producing a liquid crystal array having a pair of substrates facing each other and having a gap in which a liquid crystal is filled, the gap formed by a spacer provided between the substrates, at least one of the substrates having an aperture section, the method comprising:

ejecting, by using an electrostatic attraction type inkjet apparatus, droplets of a liquid onto a spacer formation surface via a nozzle of the electrostatic attraction type inkjet apparatus so as to form the spacer, the nozzle having an ejection hole having a diameter smaller than a diameter of the droplets, the liquid comprising a solid spacer, and each of the droplets being 1pl or less in amount.

24. The method as set forth in Claim 23, wherein:

a material ejected from the nozzle has a viscosity of 30cP or more.

25. A method as set forth in Claim 23, wherein:

that substrate on which the spacer is to be formed is configured such that a color filter is formed on a

transparent substrate, the color filter colored with at least three colors or more.

26. A method as set forth in Claim 23, wherein:

that substrate on which the spacer is to be formed is an active matrix substrate in which an active element is provided per pixel.

27. A method for producing a liquid crystal array having a pair of substrates facing each other, and having a gap in which a liquid crystal is filled, the gap formed by a spacer provided between the substrates, at least one of the substrates having an aperture section, the method comprising:

after providing an individual spacer on a spacer providing surface,

positioning the individual spacer by hitting the solid spacer with a droplet ejected via a nozzle of an electrostatic attraction type inkjet apparatus so as to move the solid spacer, the nozzle having an ejection hole having a diameter smaller than a diameter of the droplet, and the droplet being 1pl or less in amount.

28. A method as set forth in Claim 27, wherein:

a material ejected from the nozzle has a viscosity of 30cP or more.

29. A method as set forth in Claim 27, wherein:

that substrate on which the spacer is to be formed is configured such that a color filter is formed on a transparent substrate, the color filter colored with at least three colors or more.

30. A method as set forth in Claim 27, wherein:

that substrate on which the spacer is to be formed is an active matrix substrate in which an active element is provided per pixel.

31. A liquid crystal array produced by the method as set forth in any one of Claims 14, 18, 23, and 27.

32. A method for producing a color filter substrate, the method comprising ejecting droplets of a liquid via an ejection hole of a nozzle by an inkjet method so as to form a color filter layer, and the liquid comprising a color filter layer material, wherein:

an electrostatic attraction type inkjet apparatus is used whose ejection hole is smaller than a diameter of the droplets; and

the droplets are ejected from the nozzle of the electrostatic attraction type inkjet apparatus in such a manner that each of the droplets is 1pl or less in amount.

33. A method as set forth in Claim 32, wherein:

the liquid has a volumetric concentration calculated from how many number of layers is to be formed with the droplets repeatedly ejected onto a same color filter layer formation region.

34. A method as set forth in Claim 32, wherein:

the liquid has a viscosity of 20cP or more.

35. A method for producing a color filer substrate by an inkjet method to eject droplets of a liquid via an ejection hole of a nozzle so as to form a color filter layer, the liquid comprising a color filter layer material, wherein:

an electrostatic attraction type inkjet apparatus is used, the electrostatic attraction type inkjet apparatus being for ejecting droplets via its nozzle in such a manner that each of the droplets is 1pl or less in amount; and

the liquid has a volumetric concentration η (%) that is substantially $\beta \times t/(\alpha \times D)$, where α is a number of layers to be formed with the droplets repeatedly ejected on a same color filter layer formation region, β is a value obtained from a ratio between the diameter of the droplets and a diameter of landed droplets in the color filter layer formation region, D is the diameter of the droplets, and t

is a thickness of the color filter layer to be formed.

36. A method as set forth in Claim 35, wherein:

the ejection hole of the electrostatic attraction type inkjet apparatus is smaller than the droplet in diameter.

37. A method as set forth in Claim 35, wherein:

the liquid has a viscosity of 20cP or more.

38. A color filter substrate produced by a method as set forth in any one of Claims 32 to 37.

39. An apparatus for producing a color filter layer substrate, the apparatus adopting an inkjet method to eject droplets of a liquid via an ejection hole of a nozzle so as to form a color filter layer, and the liquid comprising a color filter layer material, wherein:

the ejection hole of the nozzle has a diameter smaller than a diameter of the droplets, the inkjet method is of electrostatic attraction type, and each of the droplets ejected via the nozzle is 1pl or less in amount.

40. An apparatus for producing a color filter substrate, the apparatus adopting an inkjet method to eject droplets of a liquid via an ejection hole of a nozzle so as to form a color filter layer, the liquid comprising a

color filter layer material, wherein:

the inkjet method is of an electrostatic attraction type and each of the droplets ejected is 1pl or less in amount; and

the liquid has a volumetric concentration η (%) that is substantially $\beta \times t/(\alpha \times D)$, where α is a number of layers to be formed with the droplets repeatedly ejected on a same color filter layer formation region, β is a value obtained from a ratio between the diameter of the droplets and a diameter of landed droplets in the color filter layer formation region, D is the diameter of the droplets, and t is a thickness of the color filter layer to be formed.